

THE STEM-BORING SAWFLY GENUS *CEPHUS* LATREILLE
(HYMENOPTERA: CEPHIDAE) IN JAPAN

DAVID R. SMITH AND AKIHIKO SHINOHARA

(DRS) Systematic Entomology Laboratory, PSI, Agricultural Research Service, U.S. Department of Agriculture, % National Museum of Natural History, Smithsonian Institution, Washington, DC 20560-0168, U.S.A. (e-mail: dsmith@sel.barc.usda.gov); (AS) Department of Zoology, National Science Museum (Natural History), 3-23-1 Hyakunincho, Shinjuku-ku, Tokyo 169-0073, Japan (e-mail: shinohar@kahaku.go.jp)

Abstract.—Two species of *Cephus* occur in Japan, *C. hyalinatus* Konow from Hokkaido and *C. brachycercus* Thomson, newly recorded from Japan, from Honshu. Clarification of past records of *Cephus* in Japan are presented. A key, descriptions, and illustrations of the abdomen are given for both species.

Key Words: stem-borers, Cephidae, *Cephus*, Japan

Cephus is primarily a Eurasian genus of 20 to 25 species, all of which are associated with grasses. Gussakovskij (1935) keyed and discussed 23 Palearctic species, Benson (1946) estimated 25 world species, and Mucche (1981) keyed and discussed 31 world species. Two species occur in North America, but one, *Cephus pygmaeus* (L.) is an introduction, and the other, *Cephus cinctus* Norton, is still open to question as to whether it is native or an early introduction from eastern Asia. Larvae bore and feed in the stems of grasses and can be especially destructive in cultivated grain crops such as wheat.

Takeuchi (1938) recorded four species of *Cephus* from northeastern Asia, but two of them, *C. nigripennis* Takeuchi and *C. sachalinensis* Takeuchi, are now placed in *Calameuta* Konow (Benson 1946). Of the other two, one, *Cephus hyalinatus* Konow, is known from eastern Asia including Japan (Hokkaido), and the other, *C. camtschaticalis* Enslin, from Kamtchatka and Sakhalin. Takeuchi (1938) corrected his previous record of *Cephus camtschaticalis* Enslin

from Hokkaido (Takeuchi 1936) to *Cephus hyalinatus*. Takeuchi later recorded *C. camtschaticalis* from Kunashiri Island, but this is corrected to *C. hyalinatus* in this paper. Togashi (1997, 1998) gave collection records of *Cephus hyalinatus* from Akan, Hokkaido, and Niigata Prefecture, Honshu, respectively, but the latter was corrected to *Stenocephalus oncogaster* Shinohara by Shinohara (1999).

Specimens of this genus are not commonly collected in Japan, and only a few from Hokkaido and Honshu are represented in collections. Based on about 35 specimens available, we record two species from Japan, *Cephus hyalinatus* from Hokkaido and *Cephus brachycercus* Thomson from Honshu. The former is widespread in eastern Asia, and the latter is widespread in Eurasia and is reported here for the first time from Japan. Based on the specimens available, there are rather constant color differences between those collected in Honshu and those from Hokkaido. Thus, at present we prefer to treat them as separate species, and we attempt to clarify past records from Japan.

Cephus belongs to the tribe Cephini, all of which are associated with grasses. It is separated from the other two genera of the tribe, *Calameuta* and *Trachelus*, by the following: Distance between antennae subequal to distance between antenna and tentorium; female sheath in dorsal view not broadened toward apex; male eighth sternite without concavity, with only a patch and apical fringe of modified flattened setae. In *Calameuta*, the distance between the antennae is much shorter than the distance between the antenna and tentorium (as 1.0: 1.5 to 2.0), and in *Trachelus* the female sheath is broadened at its apex and the male eighth sternite has a deep concavity with modified setae.

KEY TO JAPANESE SPECIES OF *CEPHUS*

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| 1. Female | 2 |
| – Male | 3 |
| 2. Abdomen (Fig. 1) with lateral yellow spots on segments 3–7, appearing almost as a lateral yellow longitudinal stripe, yellow transverse bands on posterior margins of abdominal segments 4 and 6, apex of 9th tergite broadly yellow; wings commonly moderately infuscated | <i>hyalinatus</i> Konow |
| – Abdomen (Fig. 2) with lateral yellow spots on segments 3 or 4–7, spots small and separated, not appearing as a lateral longitudinal stripe, without yellow transverse bands, though 6th segment sometimes with narrow incomplete band on posterior margin, 9th tergite narrowly yellow at apex; wings hyaline | <i>brachycercus</i> Thomson |
| 3. Abdomen (Fig. 3) with transverse yellow bands on posterior margins of segments 3, 4, 6, and 7, narrow or incomplete on 3 and 7, segments 3 or 4–7 with lateral yellow spots, sometimes minute spots on 2 and 8; wings commonly moderately infuscated; venter of cervical sclerite usually with yellow spot; mesepisternum with yellow spot on extreme upper corner and yellow spot usually on lower anterior area | <i>hyalinatus</i> Konow |
| – Abdomen (Fig. 4) with transverse yellow bands on posterior margins of segments 4 and 6, lateral yellow spots on segments 3 or 4–7; wings hyaline; cervical sclerites and mesepisternum usually black except sometimes inner ventral surface of cervical sclerite with yellow spot and possibly a small yellow spot on dorsal corner of mesepisternum | <i>brachycercus</i> Thomson |

Cephus hyalinatus Konow (Figs. 1, 3)

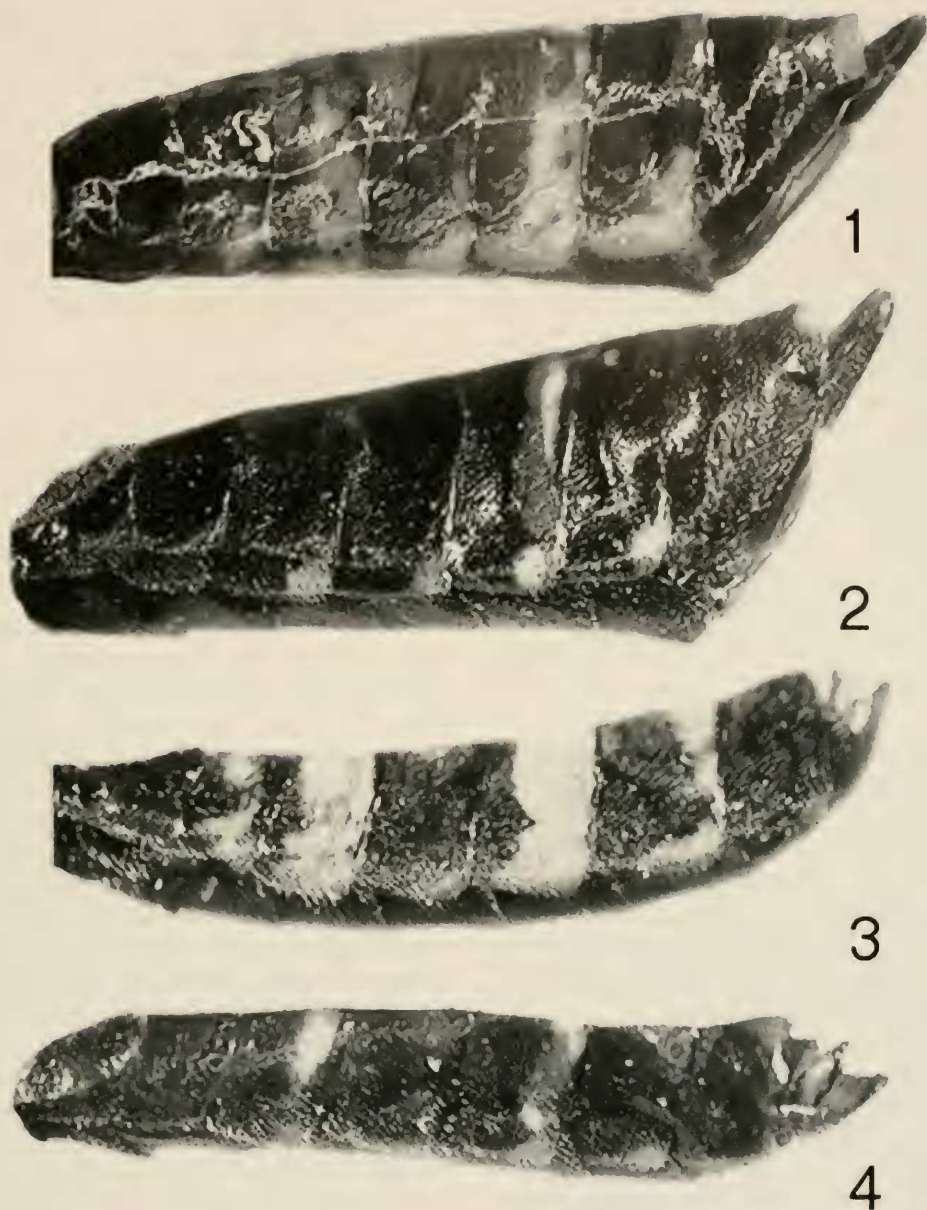
Cephus hyalinatus Konow 1897: 173.—
Takeuchi 1938: (Hokkaido).—Togashi
1997: (Hokkaido).

Cephus camtschatcalis: Takeuchi 1936:
59.—Takeuchi 1955: 9 (misidentifica-
tions).

This species was described from “Siberia or. (Irkutsk).” It has been recorded from various localities in eastern Russia (Gussakovskij 1935, Verzhutskii 1966), Kunashiri Island (Takeuchi 1955 [as *C. camtschatcalis*]), and Hokkaido, Japan (Takeuchi 1936 [as *C. camtschatcalis*]), Takeuchi 1938).

Female.—Length, 9.0–11.0 mm. Antenna and head black; mandible yellow with apex reddish brown; maxillary palpal segments 3–6 yellow. Thorax black, sometimes extreme upper corner of mesepisternum with small yellow spot. Fore- and midlegs black with tibiae and tarsi yellow. Hindleg black with tibia yellow with about apical fourth black. Abdomen black with segments 3–7 yellow laterally, yellow extending width of segments, thus appearing as a lateral longitudinal stripe; transverse yellow bands on posterior margins of segments 4 and 6; apex of 9th tergite broadly yellow. Oblong plate (valvifer 2) yellow ventrally. Wings moderately, uniformly infuscated; costa and anterior margin of stigma yellowish, rest of stigma and veins black. Antenna with 18 or 19 segments; preapical segments slightly longer than broad. Hindtibia with 2 preapical spines. Tarsal claw with a minute inner tooth, much shorter than outer tooth.

Male.—Length, 8.0–9.5 mm. Outer surface of antenna from segment 5 to apex yellowish. Head black, usually with yellow spot on lower inner orbit near malar area and spot on supraclypeal area bordering clypeus; these spots sometimes small or absent. Thorax black with yellow spot on extreme upper corner of mesepisternum; perapterum yellow; yellow spot on lower anterior mesepisternum, and yellow spot on



Figs. 1-4. Abdomen, lateral view. 1, *Cephus hyalinatus*, female. 2, *C. brachycercus*, female. 3, *C. hyalinatus*, male. 4, *C. brachycercus*, male.

venter of cervical sclerite. Fore- and mid-legs with coxae yellow anteriorly, black posteriorly; trochanters black; outside margin of femora black, inside margin of femora and tibiae and tarsi yellow; hindleg similar but black mainly at base of coxa with apical half or more yellow. Abdomen black

with lateral yellow spots on segments 3 or 4-7, sometimes minute spots on 2 and 8, spots separated; yellow transverse bands on posterior margins of segments 3, 4, 6, and 7, usually narrower on 3 and sometimes incomplete on 3 and 7. Apex of hypandrium and harpes of male genitalia yellow.

Japan records.—Hokkaido: Wakkanai, 7-VII-1977, col. K. Baba (2 ♀, 3 ♂); same except 5-VII-1977 (1 ♂); Rishiri Is., 2-VII-1968, T. Naito leg. (2 ♀, 1 ♂); Kawayu, 25-VI-1969, T. Naito (1 ♂); Teshio, 2-VII-1930, Takeuchi (identified as *C. hyalinatus* by Takeuchi) (1 ♂).

Other specimens examined.—Russia, Sakhalin: Konuma, 7-VII-1930 (identified as *C. hyalinatus* by Takeuchi) (2 ♀); Karafuto (= Sakhalin), 1922, coll. M. Yano ("753" K. Sato Collection 1975) (2 ♀); Sakhalin, Yuzhno-Sakhalinsk City, meadows near forest stream, 15-VI-1971, V. Ermolenko (3 ♂); Sakhalin, Shenbunino Vil., meadow along Japanese Sea, 19-VI-1971, V. Ermolenko (1 ♀, 1 ♂). Russia, Primorski Krai, Primorskoe Vil., Reserve Kedzovaya "Padj", 11-VI-1966, G. Anufriev (1 ♂). Kuriles, Kunashiri, Yambetsu, 22–25-VII-1935, T. Uchida (1 ♀, 5 ♂); Etorofu, Porosu 14–15-VII-1936 (2 ♂), Seseki 16–18-VII-1936, Y. Sugihara (1 ♀) (identified as *C. camtschatcalis* by Takeuchi). Kunishiri Island, Alekhino Vil., wet meadow along forest stream, 27-VI-1971, V. Ermolenko (2 ♂). Shikotan Island, Krabozavodsk Vil., meadows along Pacific Ocean, on flower of *Ranunculus* sp., 6-VII-1971, V. Ermolenko (7 ♀, 4 ♂). Shikotan Island, Malo-Kuril'sk Vil., meadows along Pacific Ocean, 9-VII-1971, V. Ermolenko (1 ♂).

Remarks.—Ivie and Zinovjev (1996) synonymized *C. hyalinatus* under *Cephus cinctus* Norton 1872 described from North America; thus, concluding that the same species occurs in Asia and North America and that the North American populations may have been the result of an early introduction from Asia. This synonymy is still open to question, and we prefer to call the Japanese specimens *C. hyalinatus* pending additional proof for the synonymy.

This species was recorded from Hokkaido by Takeuchi (1936, 1938), the latter reference correcting his 1936 identification of *C. camtschatcalis* to *C. hyalinatus*. We have seen the specimen on which Takeuchi based this record and confirm his identification as

C. hyalinatus. Takeuchi (1955) recorded *C. camtschatcalis* from Kunishiri Island. We have examined those specimens, deposited in Hokkaido University, Sapporo, and confirm that they are actually *C. hyalinatus*. Togashi's (1998) record of *C. hyalinatus* from Honshu was erroneous and is actually *Stenocephus oncogaster* (Shinohara 1999).

Cephus brachycercus Thomson
(Figs. 2, 4)

Cephus brachycercus Thomson 1871: 322.

This species was described from Europe, but it occurs across the Palearctic (Gussakovskij 1935, Verzhutskii 1966) and is here newly recorded from Honshu, Japan.

Female.—Length, 6.5–8.3 mm. Antenna and head black; mandible yellow with apex reddish brown. Thorax black. Fore- and midlegs black with tibiae and tarsi yellow; hindleg black with tibiae yellow except for black on about apical fourth. Abdomen black with small lateral spots on segments 3 or 4–7, spots small and separated; sometimes a narrow, incomplete yellow transverse band on posterior margin of segment 6; apex of 9th tergite narrowly yellow. Ob-long plate (valvifer 2) narrowly yellow on margin. Wings hyaline; costa and anterior margin of stigma yellowish, rest of stigma and veins black. Antenna with 18 to 22 segments; preapical segments about as broad as long. Hindtibia with 2 preapical spines. Tarsal claw with small inner tooth, much smaller than outer tooth.

Male.—Length, 6.0–8.0 mm. Head and thorax black; inner ventral surface of cervical sclerite sometimes with yellow spot, and sometimes small yellow spot on dorsal corner of mesepisternum; perapteron yellow. Fore- and midlegs with coxae yellow anteriorly, black posteriorly; trochanters yellow anteriorly; outside margin of femora black, inside margin of femora and tibiae and tarsi yellow; hindleg similar but black mainly at base of coxa with apical half or more yellow. Abdomen with lateral yellow spots on segments 3 or 4 to 7, sometimes

small on 3; transverse yellow bands on posterior margins of segments 4 and 6.

Japan records.—Honshu: Mt. Hakkoda, Aomori Pref., 20-VII-1965, T. Naito leg. (2 ♂); Sukayu, Aomori Pref., 20-VII-1965, col. T. Naito (2 ♀, 5 ♂); Mt. Hakkoda (Towadako), Aomori Pref., 7-VIII-1988, M. Yamada (1 ♂); Mt. Iwaki, Aomori Pref., 7-VII-1995, M. Yamada (1 ♀); Sasayama, Hyogo Pref., 27-V-1954, S. Momoi (1 ♀, 3 ♂).

Remarks.—*Cephus brachycercus* occurs in Europe and has been recorded from Siberia, at least to the Irkutsk Region (Gussakovskij 1935, Verzhutskii 1966, Zhelochovtsev and Zinovjev 1996). We have not seen records from farther east, but it could occur in more eastern regions and into Japan, or it could be an introduction into Japan. The specimens agree with *C. brachycercus* specimens from Europe and key to *C. brachycercus* in existing keys (e.g., Gussakovskij 1935). It is not a species treated by Takeuchi (1938).

Many species of *Cephus* appear to be based on color differences, but coloration varies, and it is difficult to evaluate the described species. The Japanese specimens are close to *C. camtschatcalis*, but *C. camtschatcalis* lacks yellow on the mandibles and the hindleg is black with only the base of the tibia and tarsus dark brown (Enslin 1926). Also, Zhelochovtsev and Zinovjev (1996) treated *C. camtschatcalis* as a questionable synonym of *C. hyalinatus*, and these Japanese specimens are distinct from *C. hyalinatus*.

Benson (1951) mentioned that *Cephus nigrinus* Thomson, known from Europe to Siberia, is close to *C. brachycercus*. *Cephus nigrinus* usually has the abdomen entirely black, but Benson noted that the abdomen sometimes may have small yellow spots. He separated *C. brachycercus* by its slightly broader flagellum, with the preapical segments broader than long, its more infuscated wings, and by the sawsheath (valvula 3) not being set in a direct line with the oblong plate (valvula 2). In the Japanese speci-

mens, the preapical antennal segments are about as broad as long, and the sawsheath is in a direct line with the oblong plate.

Because of the favorable similarity of the Japanese specimens with *C. brachycercus*, we believe it is best to refer these specimens to that species. Since we are not sure of the significance of the characters used by Benson, and since the entire genus needs revisionary study, we prefer not to describe a separate species at least until taxonomic problems within the genus are resolved.

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